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TSC-0164
April 1964

EMULSIFIABLE CONCENTRATES OF INSECTICIDES PERMITTED IN ANIMAL
DISEASE ERADICATION DIVISION PROGRAMS

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Agricultural Research Service
United States Department of Agriculture

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TSC (Technical Services Chemistry)

Animal Disease Eradication Division Specification
Agricultural Research Service
United States Department of Agriculture

Technical Services

EMULSIFIABLE CONCENTRATES OF INSECTICIDES PERMITTED IN ANIMAL
DISEASE ERADICATION DIVISION PROGRAMS

1. SCOPE

1.1 This specification covers emulsifiable insecticide concentrates permitted¹ in the official treatment of specific livestock diseases as authorized by the Code of Federal Regulations administered by the Animal Disease Eradication Division.

1.2 This is a general specification designed to cover all permitted emulsifiable insecticide formulations now in use or which may be adopted by the Animal Disease Eradication Division.

1.3 The specification covers emulsifiable insecticide concentrates of unlimited formulation except as specified with regard to amount of active insecticide ingredient. Refer to 2.1 and 2.1.1.

2. REQUIREMENTS

2.1 Composition - There are no restrictions regarding the solvent or emulsifiers to be used in emulsifiable insecticide concentrates so long as these are non-injurious to livestock under normal conditions of use. However, regardless of composition, the formulation must pass the emulsion stability test as specified in 2.2.

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1. The term "permitted" refers to those compounds that meet the standards of the Animal Disease Eradication Division for the particular use required. Only "permitted" compounds can be used in official work of the Animal Disease Eradication Division. It should be noted that though a product may be approved by the United States Department of Agriculture, this does not necessarily imply it is "permitted" in Animal Disease Eradication programs.

2.1.1 The amount of active insecticide ingredient shall be stipulated by the Animal Disease Eradication Division and be listed in section 3. Methods of test for insecticide ingredient will be given by reference to pertinent publications in the same section.

2.2 Emulsion stability. - The emulsifiable insecticide formulation must pass the emulsion stability test here described:

Apparatus:

- 1) Tubing, Pyrex glass, 4 feet long by 22 mm outside diameter Corning #234220, or equivalent. Fifteen are required per test.
- 2) Conical centrifuge tubes, 15 ml graduated, Corning #8080, or equivalent. Fifteen are required per test.
- 3) Rubber tubing, amber latex, 5/8 in. bore, 1/8 in. wall, The Chemical Rubber Company Cat. #13-8910, or equivalent.

An emulsion test tube is constructed from the above materials by attaching the beaded lip of a conical centrifuge tube flush to the end of the Pyrex glass tube by means of an approximately $2\frac{1}{2}$ in piece of rubber tubing.

- 4) "Luer-lok" syringe, 5 cc capacity, Becton, Dickinson and Company Cat. #H5W1, or equivalent, fitted with a 4 inch 13 gauge stainless steel blunt end needle bent at about 90° approximately 2 inches from its end.

Reagents:

- 1) Distilled water.
- 2) Soft water with hardness equivalent to 20 parts per million calcium carbonate. It is composed of 0.0094 grams of calcium chloride, 0.8000 grams of sodium bicarbonate and 0.0103 grams of magnesium chloride per liter of distilled water.

3) Hard water equivalent to 500 parts per million of calcium carbonate and composed of 0.2345 grams of calcium chloride and 0.2680 grams of magnesium chloride per liter of distilled water.

Procedure:

Three emulsion test tubes are filled with 350 milliliters of each of the test waters and placed vertically in a rack in an $85^{\circ} \pm 1^{\circ}\text{F}$ incubator.² The emulsifiable concentrate and test waters are brought to $85^{\circ} \pm 1^{\circ}\text{F}$ and the test is conducted at this temperature through the first 24 hours. By means of syringe, an amount of concentrate equivalent to use-dilution is added through the bent needle from approximately $\frac{1}{2}$ inch above the center of the test waters with a slow squeezing action. Evaluation of emulsion behaviour, referred to below, should begin at this point.

After 24 hours, the emulsion test tubes are removed from the 85.0°F incubator, given one complete inversion and placed in a rack at ambient room temperature. One complete inversion consists of stoppering and inverting the emulsion tube to effect complete mixing of its contents, and then reinverting to its original vertical position. The emulsion test is evaluated again at 30, 60, 90, and 120 days.

The concentrate is then placed in a 110.0°F incubator and the test is repeated, as above, at 30, 60, 90, and 120 days. Incubation at 110.0°F is intended

2. An 85° incubator may be conveniently constructed from a metal locker or wardrobe. Temperature regulation may be obtained by centrally locating a bellows-type bi-metallic thermostat actuating a microswitch attached to a line-operated hot plate. The hot plate is placed in the bottom of the locker and is insulated from the emulsion tubes by a wide wood moulding attached to the sides of the locker. This moulding provides support for the bottom of the tubes. Emulsion tubes are held by a rack made from a number of straight rubber-stamp holder strips attached to the sides of the locker. The whole cabinet should be insulated with 2 inch blanket of aluminum foil wrapped fiber glass insulation glued to its outer surface.

to test the product's shelf-life, and is based on commercial shelf-life anticipation studies. For emulsion concentrates, 120 days at 110.0°F is expected to simulate approximately 1.25 years of storage at ambient temperatures. This estimation is based on a product newly formulated.

Evaluation of the Emulsion Test:

- 1) Initial addition of emulsion concentrate: The insecticide should disperse spontaneously in all test waters with the oil phase spreading as it sinks. No oil droplets should reach the bottom of the tube.
- 2) Observation at 1 hour: After standing 1 hour, there should be no more than a trace of bottom cream.
- 3) Observation at 24 hours: There should be no more than 0.2 ml of bottom cream in 24 hours.
- 4) Observation upon inversion: Any bottom cream should resuspend completely.
- 5) Observation at 30, 60, 90, and 120 days: There should be no more than 0.2 ml bottom cream in any of the tubes.

Repeated failure of an emulsifiable concentrate formulation to conform with the above specifications should be grounds for rejection of the product as an official permitted insecticide.

Since the emulsion must often be stable in dipping vats for extended periods, 60 days at shelf-life simulation is the minimum emulsion test observation period. For adequate safety, however, 120 days is recommended.

2.3 Application for Permitted Insecticide.- Both manufacturer and distributor are required to certify that their formulation will be kept uniform with specifications. Forms ADE 10-12 and 10-13 for this purpose are obtainable from

Director, Animal Disease Eradication Division, Agricultural Research Service,
United States Department of Agriculture, Federal Center Building, Hyattsville,
Maryland 20781.

2.3.1 In addition, the manufacturer must submit a representative sample
(16 oz) and a printed label for examination.

2.3.2 Deviation from specifications and any change in brand name will
invalidate the permission granted under application.

2.4 Labeling.- The labeling shall be registered in accordance with the
Federal Insecticide, Fungicide and Rodenticide Act under the jurisdiction
of the Pesticides Regulation Division, Agricultural Research Service, Washington
25, D. C.

3. APPLICABLE STANDARDS AND PUBLICATIONS

Literature regarding permitted emulsifiable insecticide formulations shall
be listed hereunder as these become available and shall form a part of these
specifications.

3.1 61% by weight Toxaphene Emulsion Concentrate: TSC-0264-ADE "Testing
Procedures for Emulsifiable Concentrates of Toxaphene".

